

**PROPOSED PROGRAM ESTIMATES (7/13/99)**  
**GRAND CANYON ADAPTIVE MANAGEMENT PROGRAM**  
**FY 2001**

<u>PROGRAM AREA</u>	<u>AMP</u>	<u>O&amp;M</u>	<u>APPR</u>
I. Bureau Administration of AMWG	120,000		
II. Bureau Administration of TWG	83,000		
III. Bureau Administration of SAB	15,000		
IV. Bureau Administration of AMP			
A. Program Management (Support Services)	130,000		
B. Biological Opinion	95,000		
C. Programmatic Agreements (Includes Logistics)	973,000		
V. Bureau/Native American Support (Appropriations)	-0-		
<b>Sub-Total I. - V:</b>	<b>1,416,000</b>		
VI. GCMRC Program and Operating Cost			
A. Bureau Support Services	125,000		
B. Operations, Personnel, Contract Service	1,969,000 <sup>1</sup>		
C. Physical Resources Science	950,000 <sup>2</sup>		
D. Biological Resources Science	1,420,000 <sup>3</sup>	300,000	310,000
E. Socio-Cultural Resources Science	425,000 <sup>4</sup>		
F. Information Technologies Program	320,000		
G. Remote Monitoring Technologies	400,000		
H. Independent Review Panels	175,000 <sup>5</sup>		
I. Logistics	650,000		
<b>Sub-Total VI. A- I:</b>	<b>6,434,000</b>	<b>300,000</b>	<b>310,000</b>
<b>Total I. - VI:</b>	<b>7,850,000</b>		

<sup>1</sup>Proposed decrease from FY 2000 level results from moving Lake Powell portion of IWQMP salaries for GCMRC staff to O&M column, but also budgeting for a 3% cost of living increase for staff salaries.

<sup>2</sup>Proposed increase from FY 2000 level results from plan to initiate three new sediment research projects.

<sup>3</sup>Exclusive of IWQMP related to Lake Powell work, TCD and SASF program items. IWQMP and TCD funding shown in O&M and APPR columns; SASF work would be contingency funded by WAPA.

<sup>4</sup>Proposed increase from FY 2000 level results from additional work on cultural and recreational issues.

<sup>5</sup>Proposed increase results from funds needed to support a full year's operation of the SAB.

## FY 20001 PROGRAM AREA BUDGET PROJECTIONS

### **VI. C. PHYSICAL RESOURCES SCIENCE**

#### **I. MONITORING OF SEDIMENT, FLOW AND SEDIMENT-RELATED FEATURES:**

- A) ***Streamflow and Sediment Monitoring of Main Channel Colorado River and Gaged Tributaries*** – approximately \$475,000,
- B) ***Monitoring of Terrestrial Shoreline Sandbars within Critical Reaches*** – approximately \$150,000,
- C) ***Monitoring of Gaged Tributary Channel Characteristics for Flow and Sediment Modeling Verification*** - approximately \$15,000,
- D) ***Change Detection for Debris Fans, Cobble Bars and Rapids*** – approximately \$30,000,
- E) ***Selected Sediment and Flow Instrumentation of Key Ungaged Tributaries in Glen and Upper Marble Canyon*** – approximately \$30,000.

MONITORING TOTAL = \$700,000

#### **II. NEW RESEARCH OF SEDIMENT, FLOW AND SEDIMENT-RELATED FEATURES – 2001**

- A) ***Initiate Research and Development of 1-Dimensional Sediment and Flow Predictive Model for the Main Channel of the Colorado River between Glen Canyon Dam and Upper Lake Mead.*** This modeling effort will focus on tracking flow using the existing Unsteady Flow Model and multiple size-classes of sand, and silt/clay from inputs at the Paria and Little Colorado River past the Grand Canyon gage (export from “critical” reaches). This will be the first of likely a three-year effort, with an estimated first-year start-up cost of \$150,000. If the additional funding is available, then this research would be competitively procured through an RFP, to be released in spring 2000.
- B) ***Initiate Integrated Research to Define and Model Relationships between the Coarse Sediment Budget of the Colorado River Ecosystem and its Aquatic Ecosystem.*** This modeling effort will investigate the linkages between tributary processes that structure the geomorphic framework of the Colorado River ecosystem, the relationships of those processes to the system’s aquatic ecosystem, and long-term implications of ROD operations at Glen Canyon Dam. This will be the first of likely a two-year effort, with an estimated first-year start-up cost of \$50,000. If the additional funding is available, then this research would be either competitively procured through an RFP, to be released in spring 2000, or conducted internally by GCMRC.
- C) ***Reach-Averaged Hydrodynamic Flow and Sediment Modeling of Sandbar Evolution within Critical Reaches of Glen and Marble Canyons.*** Unlike sandbar modeling that has previously occurred within the context of developing the Conceptual Model, this modeling research project will attempt to predict eddy-bar and channel-margin evolution under a variety of ROD scenarios, including BHBF and HMF implementation, thought to influence backwater habitats, campable areas, pre-dam river terraces and the terrestrial substrates where riparian vegetation exists. This will be the first of likely a two-year effort, with an estimated first-year start-up cost of \$50,000. If the additional funding is available, then this research would be competitively procured through an RFP, to be released in spring 2000.

RESEARCH AND MONITORING TOTAL = \$950,000

**VI. D. BIOLOGICAL RESOURCES SCIENCE**

Aquatic food base	Extend contract	230,000
Native Fish	Extend Contract	470,000
Lees Ferry Trout		130,000
Water Quality		50,000
Aquatic Monitoring Total		880,000
Terrestrial Monitoring (Vegetation & bird monitoring)		200,000
Research (fish)		50,000
In-house Biology Research		50,000
Protocol evaluation (fish & food base)		40,000
<b>Total</b>		<b>\$1,220,000</b>

**Temperature Control Device**

Funding beyond monitoring to address TCD issues. These are research Questions that may be addressed either in a lab or field environment.

**Water Quality**

Effects of warm and cold water releases on nutrient in the forebay and in downstream releases.  
\$50,000

**Aquatic food base**

Productivity, compositional shifts of benthos, algae and drift under temporary warming conditions (lab experiments, modeling and literature review). \$50,000

**Fish**

Effects of warm or cold water releases on timing of trout and other non-native fish life histories and recruitment in Lees Ferry and downstream (includes data analysis, literature review, modeling lab experiments). \$90,000

Spawning or recruitment success in mainstem native fish populations (trials to determine the best method to measure these parameters in the mainstem when a TCD flow occurs).  
\$70,000

**Shoreline Vegetation**

Effects of warming on marsh community constituents-- with emphasis on traditional cultural properties and plant species found to support insect faunal that are utilized by bird populations (literature review, data analysis, methodology to determine effects). \$50,000

**Total proposed TCD costs for FY 2001** **\$310,000**

### **Seasonally Adjusted Steady Flows**

There is currently a contract underway to develop flow experiments associated with SASF. SASF may be implemented as early as FY2001, depending on hydrology. As with the TCD, data collection efforts would be directed toward answering specific questions associated with an action, and additional funds would be needed for these research questions.

<b>Native fish</b> (3 trips @40,000/trip including data entry time)	<b>\$120,000</b>
<b>Aquatic food base</b> (2 trips plus sorting and data entry)	<b>\$ 60,000</b>
Additional logistic costs	
Fish trips (\$25k/trip)	\$70,000
Aquatic food base (10k/trip)	\$20,000
<b>Total proposed SASF budget</b>	<b>\$270,000</b>
<b>Total proposed FY 2001 Budget</b>	<b>\$1,800,000</b>

## **VI. E. SOCIOCULTURAL RESOURCES SCIENCE**

### **SOCIO-CULTURAL BUDGET DETAILS FOR FY 2001 \$ 70,000 INCREASE**

Based on the comments made at the February TWG meeting, a \$ 70,000 budget increase is proposed for this program. The details of the increase are as follows:

- A) Cultural area: A \$ 50,000 increase is proposed. The increased funds would be applied to two areas. First, the funds would supplement previously approved monies allocated for additional work related to geomorphology in FY2000. It is anticipated that there may be questions resulting from the current study that may require more work. Second, some of the additional funds would be programmed for protocol evaluations within the cultural area. These funds would be in addition to previously programmed monies that would be used for protocol evaluations that would begin in FY2000. Given the level of interest by the TWG members in these two areas, a request for additional funds seems warranted.
- B) Recreational area: A \$ 20,000 increase is proposed. These funds would be programmed for unanticipated information requests, additional work relative to campsite synthesis, and recreational fishing protocol assessments and information synthesis. These additional funds seem necessary given that unanticipated information requests in this area are not currently budgeted, the current studies may suggest additional areas for inclusion with the campsite synthesis, and recreational fishing information may require synthesis and a data protocol review.